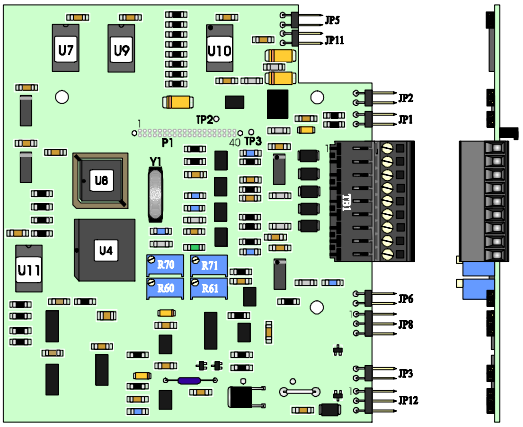
FKI Energy Technology

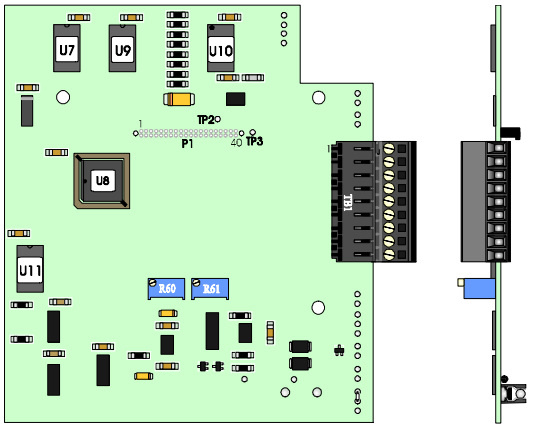
EXPANSION RS-485 and/or ANALOG OUTPUT BOARD Series No. 392971-XX-X

(For Models 3530-XXX)

For The Following BBI Instruction Manuals: CI-3530-10B, CI-3530-15B, CI-3530-20B, CI-3530-25B, CI-3530-35B, CI-3530-40B & CI-3530-50B



Expansion
RS-485 & AO Board
(P/N 392971-01-0)



Expansion
Analog Output Board
(P/N 392971-02-0)

Bristol Babcock

NOTICE

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Request for Additional Instructions

Additional copies of instruction manuals may be ordered from the address below per attention of the Sales Order Processing Department. List the instruction book numbers or give complete model number, serial or software version number. Furnish a return address that includes the name of the person who will receive the material. Billing for extra copies will be according to current pricing schedules.

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IMPORTANT! READ INSTRUCTIONS BEFORE STARTING!

Be sure that these instructions are carefully read and understood before any operation is attempted. Improper use of this device in some applications may result in damage or injury. The user is urged to keep this book filed in a convenient location for future reference.

These instructions may not cover all details or variations in equipment or cover every possible situation to be met in connection with installation, operation or maintenance. Should problems arise that are not covered sufficiently in the text, the purchaser is advised to contact Bristol Babcock for further information.

EQUIPMENT APPLICATION WARNING

The customer should note that a failure of this instrument or system, for whatever reason, may leave an operating process without protection. Depending upon the application, this could result in possible damage to property or injury to persons. It is suggested that the purchaser review the need for additional backup equipment or provide alternate means of protection such as alarm devices, output limiting, fail-safe valves, relief valves, emergency shutoffs, emergency switches, etc. If additional in-formation is required, the purchaser is advised to contact Bristol Babcock.

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When returning any equipment to Bristol Babcock for repairs or evaluation, please note the following: The party sending such materials is responsible to ensure that the materials returned to Bristol Babcock are clean to safe levels, as such levels are defined and/or determined by applicable federal, state and/or local law regulations or codes. Such party agrees to indemnify Bristol Babcock and save Bristol Babcock harmless from any liability or damage, which Bristol Babcock may incur or suffer due to such party's failure to so act.

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Metal enclosures and exposed metal parts of electrical instruments must be grounded in accordance with OSHA rules and regulations pertaining to "Design Safety Standards for Electrical Systems," 29 CFR, Part 1910, Subpart S, dated: April 16, 1981 (OSHA rulings are in agreement with the National Electrical Code).

The grounding requirement is also applicable to mechanical or pneumatic instruments that include electrically-operated devices such as lights, switches, relays, alarms, or chart drives.

EQUIPMENT DAMAGE FROM ELECTROSTATIC DISCHARGE VOLTAGE

This product contains sensitive electronic components that can be damaged by exposure to an electrostatic discharge (ESD) voltage. Depending on the magnitude and duration of the ESD, this can result in erratic operation or complete failure of the equipment. Read BBI document S14006 for proper care and handling of ESD-sensitive components.

Bristol Babcock 1100 Buckingham Street, Watertown, CT 06795
Telephone (860) 945-2200

WARRANTY

A. Bristol warrants that goods described herein and manufactured by Bristol are free from defects in material and workmanship for one year from the date of shipment unless otherwise agreed to by Bristol in writing.

B. Bristol warrants that goods repaired by it pursuant to the warranty are free from defects in material and workmanship for a period to the end of the original warranty or ninety (90) days from the date of delivery of repaired goods, whichever is longer.

C. Warranties on goods sold by, but not manufactured by Bristol are expressly limited to the terms of the warranties given by the manufacturer of such goods.

D. All warranties are terminated in the event that the goods or systems or any part thereof are (i) misused, abused or otherwise damaged, (ii) repaired, altered or modified without Bristol's consent, (iii) not installed, maintained and operated in strict compliance with instructions furnished by Bristol, or (iv) worn, injured or damaged from abnormal or abusive use in service time.

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A. Buyer's sole remedy for breach of any warranty is limited exclusively to repair or replacement without cost to Buyer of any goods or parts found by Seller to be defective if Buyer notifies Bristol in writing of the alleged defect within ten (10) days of discovery of the alleged defect and within the warranty period stated above, and if the Buyer returns such goods to Bristol's Watertown office, unless Bristol's Watertown office designates a different location, transportation prepaid, within thirty (30) days of the sending of such notification and which upon examination by Bristol proves to be defective in material and workmanship. Bristol is not responsible for any costs of removal, dismantling or reinstallation of allegedly defective or defective goods. If a Buyer does not wish to ship the product back to Bristol, the Buyer can arrange to have a Bristol service person come to the site. The Service person's transportation time and expenses will be for the account of the Buyer. However, labor for warranty work during normal working hours is not chargeable.

B. Under no circumstances will Bristol be liable for incidental or consequential damages resulting from breach of any agreement relating to items included in this quotation from use of the information herein or from the purchase or use by Buyer, its employees or other parties of goods sold under said agreement.

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You can easily obtain a RA number by:

A. FAX
Completing the form (GBU 13.01) and faxing it to (860) 945-3875. A BBI Repair Dept. representative will return call (or other requested method) with a RA number.

B. E-MAIL
Accessing the form (GBU 13.01) via the Bristol Babcock Web site (www.bristolbabcock.com) and sending it via E-Mail to brepair@bristolbabcock.com. A BBI Repair Dept. representative will return E-Mail (or other requested method) with a RA number.

C. Mail
Mail the form (GBU 13.01) to

Bristol Babcock Inc.
Repair Dept.
1100 Buckingham Street
Watertown, CT 06795

A BBI Repair Dept. representative will return call (or other requested method) with a RA number.

D. Phone
Calling the BBI Repair Department at (860) 945-2442. A BBI Repair Department representative will record a RA number on the form and complete Part I, then send the form to the Customer via fax (or other requested method) for Customer completion of Parts II & III.

A copy of the completed Repair Authorization Form with issued RA number should be included with the product being returned. This will allow us to quickly track, repair, and return your product to you.

Bristol Babcock Inc. Repair Authorization Form

(Providing this information will permit BBI to effectively and efficiently process your return. Completion is required to receive optimal lead time. Lack of information may result in increased lead times.)

Date_____ **RA #**_____**SH**_ **Line No.**_____

Standard Repair Practice is as follows: Variations to this is practice may be requested in the "Special Requests" section.

- Evaluate / Test / Verify Discrepancy
- Repair / Replace / etc. in accordance with this form
- Return to Customer

Please be aware of the Non warranty standard charge:

- There is a $100 minimum evaluation charge, which is applied to the repair if applicable (√ in "returned" B,C, or D of part III below)

Part I Please complete the following information for single unit or multiple unit returns

Address No. _____ **(office use only)** **Address No.** _____ **(office use only)**

Bill to :_____ **Ship to:**_____

_____ _____

_____ _____

Purchase Order:_____ **Contact Name:**_____

Phone:_____ **Fax:**_____**E-Mail:** _____

Part II Please complete Parts II & III for each unit returned

Model No./Part No._____ **Description** _____

Range/Calibration _____ **S/N** _____

Reason for return : ☐ Failure ☐ Upgrade ☐ Verify Operation ☐ Other _____

1. Describe the conditions of the failure (Frequency/Intermittent, Physical Damage, Environmental Conditions, Communication, CPU watchdog, etc.)

_____

_____

_____

_____(Attach a separate sheet if necessary)

2. Comm. interface used: ☐ Standalone ☐ RS-485 ☐ Ethernet ☐ Modem (PLM (2W or 4W) or SNW) ☐Other:_____
3. What is the **Firmware** revision? _____ What is the **Software** &version? _____

Part III If checking "replaced" for any question below, check an alternate option if replacement is not available

A. If product is within the warranty time period but is excluded due to BBI's warranty clause, would you like the product: ☐ repaired ☐ returned ☐ replaced ☐ scrapped?

B. If product were found to exceed the warranty period, would you like the product: ☐repaired ☐ returned ☐ replaced ☐ scrapped?

C. If product is deemed not repairable would you like your product: ☐ returned ☐ replaced ☐ scrapped?

D. If BBI is unable to verify the discrepancy, would you like the product: ☐ returned ☐ replaced ☐ *see below?

* Continue investigating by contacting the customer to learn more about the problem experienced? The person to contact that has the most knowledge of the problem is: _____ phone_____

If we are unable to contact this person the backup person is: _____ phone _____

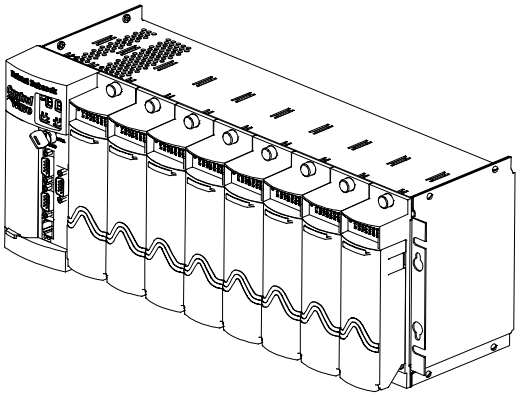
Special Requests: _____

_____

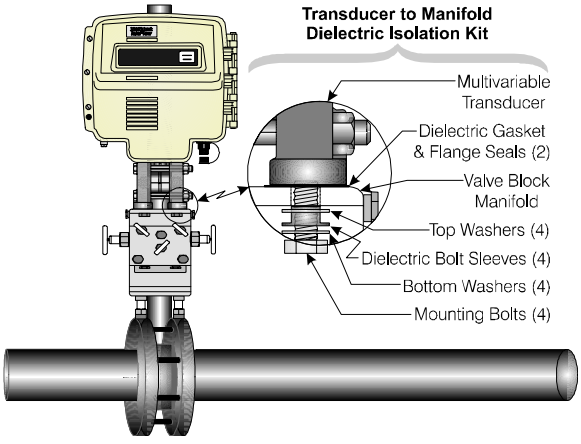
Ship prepaid to: Bristol Babcock Inc., Repair Dept., 1100 Buckingham Street, Watertown, CT 06795
Phone: 860-945-2442 Fax: 860-945-3875

Bristol Babcock
Training

GET THE MOST FROM YOUR BRISTOL BABCOCK INSTRUMENT OR SYSTEM



- Avoid Delays and problems in getting your system on-line
- Minimize installation, start-up and maintenance costs.
- Make the most effective use of our hardware and software.
- Know your system.



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For information or to enroll in any class, contact our training department in Watertown at (860) 945-2269. For Houston classes, you can also contact our Houston office, at (713) 685-6200.

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For over 100 years, Bristol® has been providing innovative solutions for the measurement and control industry. Our product lines range from simple analog chart recorders, to sophisticated digital remote process controllers and flow computers, all the way to turnkey SCADA systems. Over the years, we have become a leading supplier to the electronic gas measurement, water purification, and wastewater treatment industries.

On off-shore oil platforms, on natural gas pipelines, and maybe even at your local water company, there are Bristol Babcock instruments, controllers, and systems running year-in and year-out to provide accurate and timely data to our customers.

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Contacting Bristol Babcock Directly

Bristol Babcock's world headquarters are located at 1100 Buckingham Street, Watertown, Connecticut 06795, U.S.A.

Our main phone numbers are:

(860) 945-2200
(860) 945-2213 (FAX)

Regular office hours are Monday through Friday, 8:00AM to 4:30PM Eastern Time, excluding holidays and scheduled factory shutdowns. During other hours, callers may leave messages using Bristol's voice mail system.

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During regular business hours, Bristol Babcock's Application Support Group can provide telephone support for your technical questions.

For technical questions about TeleFlow™ products call (860) 945-8604.

For technical questions about **Control**Wave call (860) 945-2244 or (860) 945-2286.

For technical questions regarding Bristol's **OpenEnterprise** product, call (860) 945-2501 or e-mail: **openenterprise@bristolbabcock.com**

For technical questions regarding **ACCOL** products, **Open BSI Utilities**, as well as Bristol's **Enterprise Server®/Enterprise Workstation®** products, call (860) 945-2286.

For technical questions about **Network 3000** hardware, call (860) 945-2502.

You can e-mail the Application Support Group at: **bsupport@bristolbabcock.com**

The Application Support Group maintains an area on our web site for software updates and technical information. Go to: **www.bristolbabcock.com/services/techsupport/**

For assistance in interfacing Bristol Babcock hardware to radios, contact Bristol Babcock's **Communication Technology Group** in Orlando, FL at **(407) 629-9463 or (407) 629-9464**.

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Questions of a non-technical nature (product orders, literature requests, price and delivery information, etc.) should be directed to the nearest sales office (listed on the rear cover) or to your Bristol-authorized sales representative. A list of

Please call the main Bristol Babcock number (860-945-2200) if you are unsure which office covers your particular area.

Visit our Site on the World Wide Web

For general information about Bristol Babcock and its products, please visit our site on the World Wide Web at: **www.bristolbabcock.com**

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PIP-EXP485/AO

EXPANSION RS-485 COMMUNICATIONS and/or ANALOG OUTPUT BOARD

PT. Number 392971-XX-X

Product Information Package

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Section 1
INTRODUCTION

1.1 DESCRIPTION

1.1.1 Function

The Expansion RS-485 Comm. Port with Analog Output Board (EXP485/AO) provides a single RS-485 communications port to ACCOL-based 3530-XXX models. In addition to assignments of the resident (host) CPU's "local" and "network" RS-232 ports, any model 3530-XXX unit equipped with a fully populated EXP485/AO Board can establish RS-485 asynchronous communications with other 3530-XXX devices and/or can interface to an Analog Output circuit. The EXP485/AO Board plugs into the Expansion Connector of the TeleFlow or TeleRTU CPU Board, is stood-off by three 15/32" long hex standoffs and is secured via three screws or standoffs depending on the model. The CPU Board Expansion Connector supplies power and 3530-XXX communication to the EXP485/AO Board.

EXP485/AO Boards measure 4.25" by 3.75" and utilizes a 9-position Industrial 3.5mm pitch plugable connector to interface (RS-485) to a series of remote 3530-XXX devices and or a single 1-5Vdc or 4-20mA AO device.

Programmable baud rates up to 19.2Kbps are supported by the EXP485/AO Board. Interface signals are available at TB1 of the EXP485/AO. When the SLEEP+ & SLEEP- signals (supplied by the Master 3530-XXX) are Low and High respectively, the remote 3530-XXX CPU Boards will be awakened. If no activity is required, the EXP485/AO Board's serial communications controller (SCC) chip and RS-485 drivers can be put to sleep (low power mode) along with the host/parent 3530-XXX and the SLEEP+ and SLEEP- signals will be set High and Low respectively.

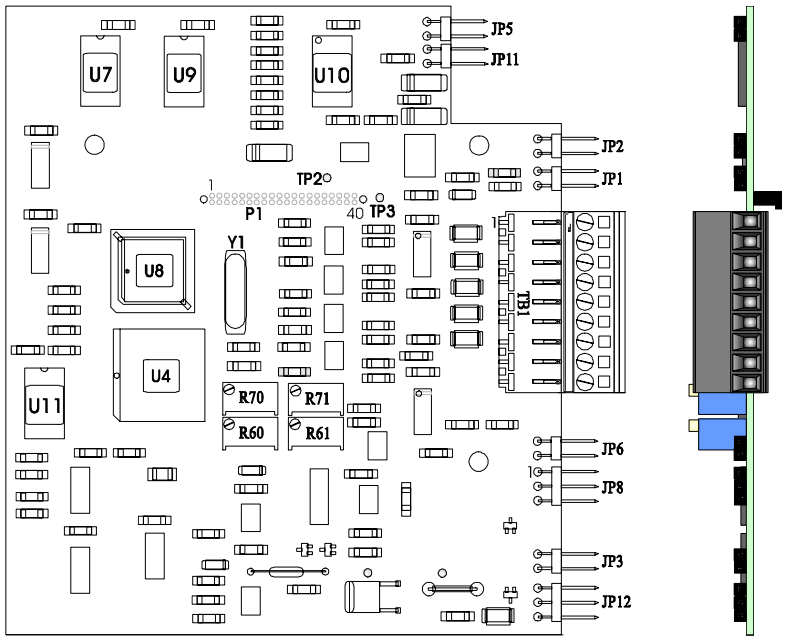

Figure 1 - EXP485/AO Board (with RS-485 & Configurable AO)

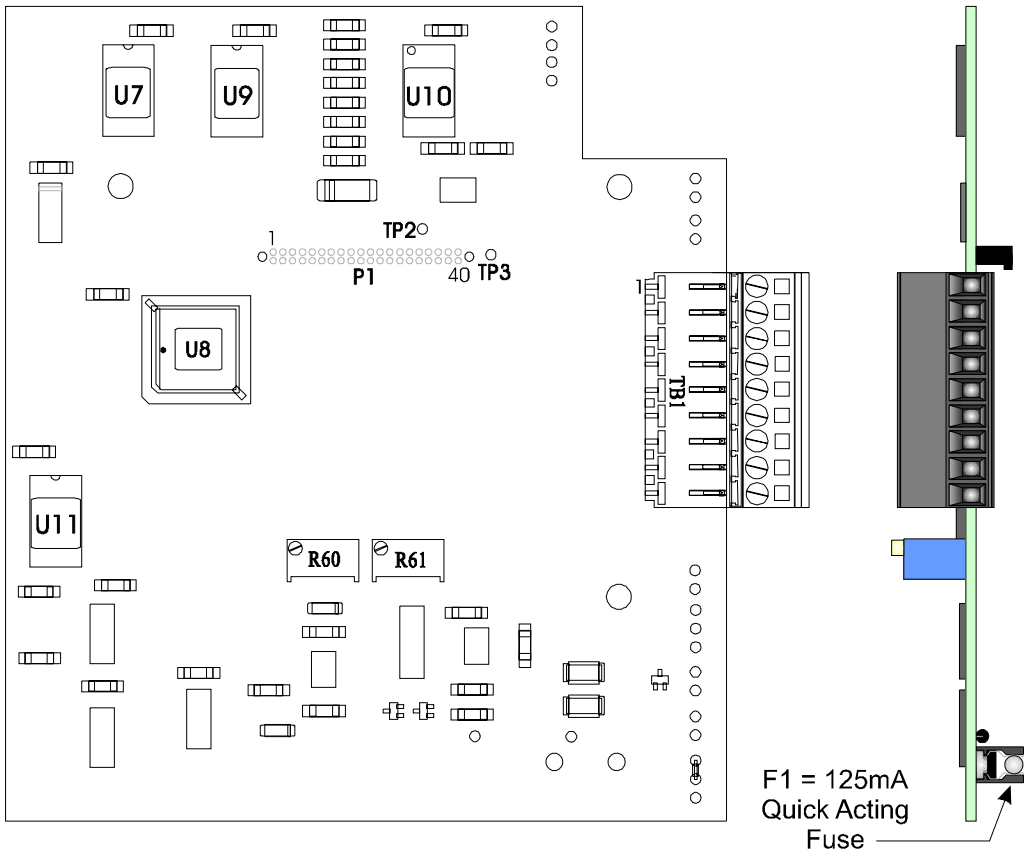

Figure 2 - EXPAO Board (with 1-5Vdc AO and without RS-485)

1.1.2 Features

- **Low Power**
  +5Vdc @ 20mA (Max) regulated power and 5.8Vdc to 16Vdc @ 50mA (Max) unregulated power are supplied by the host/parent 3530-XXX via the 40-pin Expansion Interface Connector P1.

- **ESD & Transient Susceptibility**
  The RS-485 I/O circuitry has been designed to meet the requirements of IEC 801-2 for ESD withstand capability up to 10KV and the requirements of ANSI/IEEE C37.90.1-1989 (formerly IEE 472) for surge withstand capability.

- **EMI Compatibility**
  EXP485/AO Boards have been designed to coexist inside a shielded enclosure with the TeleFlow™ electronics. EMI radiation is insignificant and susceptibility is comparable or superior to associated electronics.

- **Mounting**
  The EXP485/AO Board measures 3.75" (9.525cm) in width x 4.25" (10.795cm) in height and mounts piggy-back on a TeleFlow or TeleRTU CPU Board.

- **RS-485 Comm. Port**
  EXP485/AO Boards provide an RS-485 communications port that is programmable for asynchronous rates up to 19.2Kbps. 3530-XXX units equipped with the EXP485/AO Board can communicate with a network of 3530-XXX units (equipped

with EXP485/AO Boards), even though a radio or modem may be installed on the CPU Board's network port.

1.2 COMPONENT IDENTIFICATION

EXP485/AO Boards do not contain LEDs or switches. Fully populated EXP485/AO Boards (P/N 392971-01-0) are provided with seven (7) configuration jumpers (see Figures 1 & 11). Depopulated EXPAO Boards (P/N 392971-02-0) are factory set for 1-5Vdc AO operation and don't have configuration jumpers (see Figure 2). Two connectors are provided; 40-pin connector P1 mates with the host 3530-XX-X (connector J4 - TeleFlow CPU or J18 - TeleRTU CPU) and accommodates the TTL interface between the two entities, while 9-pin connector TB1 mates with the RS-485 device that is being interfaced to the 3530-XXX and/or an analog output device. Additionally, the 3.5mm pitch plugable connector TB1 is removable from its mating EXP485/AO Board socket.

1.3 INSTALLATION COMPATIBILITY

An EXP485/AO Board can be installed into any of the following 3530-XXX models:

3530-10B - TeleFlow
3530-15B - TeleRTU
3530-20B - TeleFlow Plus
3530-25B - TeleRTU Plus
3530-35B - TeleRTU Module
3530-40B - TeleFlow ECR
3530-50B - TeleFlow Corrector

1.3.1 Restrictions

The 3530-XXX in question must be equipped with ACCOL application software. The TeleFlow Plus (3530-20B), TeleRTU Plus (3530-25B) and the TeleRTU Module (3530-35B) support installation of either a Low Power I/O Expansion Board (LPI/OEB), an EXPCOM232 Board, or the EXP485/AO Board discussed herein, i.e., **YOU CAN ONLY INSTALL ONE (1) OF THESE ITEMS**.

EXP485/AO Board (P/N 392971-01-0) is fully populated and supports RS-485 network communications and interface to either a 1-5Vdc or a 4-20mA analog output device.

P/N 392971-02-0 is a depopulated version of the EXP485/AO Board and only supports interface to a 1-5Vdc analog output device. Connector TB1 has two usable pins (08 = AO and 09 = AOGND). This version is designed for use in a Class I, Division 2, Groups C and D nonincendive environment or a Class I, Division 1, Groups C and D intrinsically safe environment.

Intrinsically safe EXPAO Boards can be installed in 3530-XXX units with 6V Lead Acid or 7.2V Lithium battery systems.

Section 2
INSTALLATION & SERVICE

2.1 EXP485/AO REMOVAL/REPLACEMENT & INSTALLATION

2.1.1 Installation/Removal of the EXP485/AO Board

In addition to hardware normally contained within the 3530-XXX in question, units with an installed EXP485/AO Option will contain the following major parts.

1. Expanded Comm. Port RS-485/AO Board (EXP485/AO)
2. Three (3) #4-40 x 15/32" Standoffs *(Note: Models 3530-10B, -15B, -40B & -50B will also contain Three (3) #4-40 x .188" Standoffs & Two (2) #4-40 x 1/8" SEM Screws)*
3. Modified PC Shield Assembly (for models 3530-10B, -15B, -40B & -50B)

WARNING

Never attempt to service a TeleFlow, TeleFlow ECR, TeleRTU or TeleFlow Corrector while it is powered and operating in a hazardous environment. Either the area must be made safe or the unit must be powered down, unwired, unmounted, and taken to a safe, non-hazardous area.

WARNING

Never attempt to install or remove any components (PCBs, Field Wiring, Transducers, etc.) while the unit is powered and running. Doing so can cause sudden electrical transients or imbalances that are capable of causing damage to the module or component in question, as well as other associated circuit boards. Always turn off the external/internal power source, including any additional supply sources used for externally-powered I/O circuits, before changing or adding any components.

CAUTION

Place any related critical processes under manual or auxiliary control prior to shutting down or performing any of the steps discussed herein.

2.1.1.1 Installation/Removal for Models 3530-10B, -15B, -40B & -50B

To install the optional EXP485/AO Board into a model 3530-10B, -15B, -40B or -50B, follow steps 1 through 14 below. To remove the optional EXP485/AO Board, see step 15. *Note: The Instrument Front Cover must be open.*

1. To open the Instrument Front Cover, remove the lock if present and turn each of the three captive screws a quarter (1/4) turn counterclockwise.

Note:
The CPU Board is not to be removed under any circumstances unless the unit has been moved to an ESD safe area (see ESDS Manual - S14006).

2. Remove the Power Plug(s), Solar Panel Power Plug, and the Auxiliary Power Plug as required, from the CPU Board in question.

3. Remove the optional radio or modem if installed.
   To remove an optional modem:
   Disconnect the phone wires. Loosen the four (4) screws that secure the Modem/Radio Mounting Plate (with modem) to the Battery Mounting Bracket. Slide the modem to the left and remove it and then disconnect the D-Type connector from the modem.
   To remove an optional radio:
   Disconnect the Radio/TeleFlow Interface Cable from the bottom of the Radio. Unplug the 2-wire power connector associated with the 2-wire Radio Power Interface Cable from the bottom of the Radio. Loosen the four (4) screws that secure the Modem/Radio Mounting Plate (with radio) to the Battery Mounting Bracket. Slide the radio to the left and remove it.

4. Remove the Battery(s) (if present).
   To remove the battery(s) from units without an optional modem or radio:
   Hold the battery securely and remove the Left Battery Mounting Bracket (secured with 2 screws. Loosen the screws which secure the Right Battery Mounting Bracket (Carefully remove the battery (with wiring harness). Remove the Right Battery Mounting Bracket.
   To remove the battery(s) from units with an optional modem or radio:
   Carefully remove the battery (with wiring harness). *Note: You may have to loosen the two left 1/4-20 x 3/8" screws that secure the left side of the Battery Mounting Bracket and the Main Mounting Bracket to the rear of the unit.* While holding the Main Mounting Bracket, remove the four (4) 1/4-20 x 3/8" screws and lock washers that secure the Battery Mounting Bracket and Main Mounting Bracket to the rear of the unit. Remove the Battery Mounting Bracket and temporarily reinstall the four screws to secure the Main Mounting Bracket to the 3530-10B, 15B, -45B or -50B.

5. Disconnect the Local Port, Network Port, RTD, and Field I/O wires from the CPU Board connectors by unplugging their associated Terminal Plugs on the front edge of the CPU.

6. Carefully remove the PC Shield which is secured to the Main Mounting Bracket by 2 (#4-40 x 1/4") screws and to the CPU Board by 2 (#4-40 x 1/4") screws.

7. Remove the screw (location 'A' in Figures 3 & 4) and the two (2) #4-40 x 5/8" Standoffs (location 'B' in Figures 2 & 3) which secure the CPU Board to the Main Mounting Bracket. Replace these items with the three new #4-40 x 15/32" Standoffs.

Note:
This operation should only be performed in an ESD safe area.

8. Align the EXP485/AO Board Connector P1 with CPU Board Connector J4 (for 3530-10B or -50B) or J18 (for 3530-15B). Push the EXP485/AO Board toward the CPU Board until Connector P1 is fully seated.

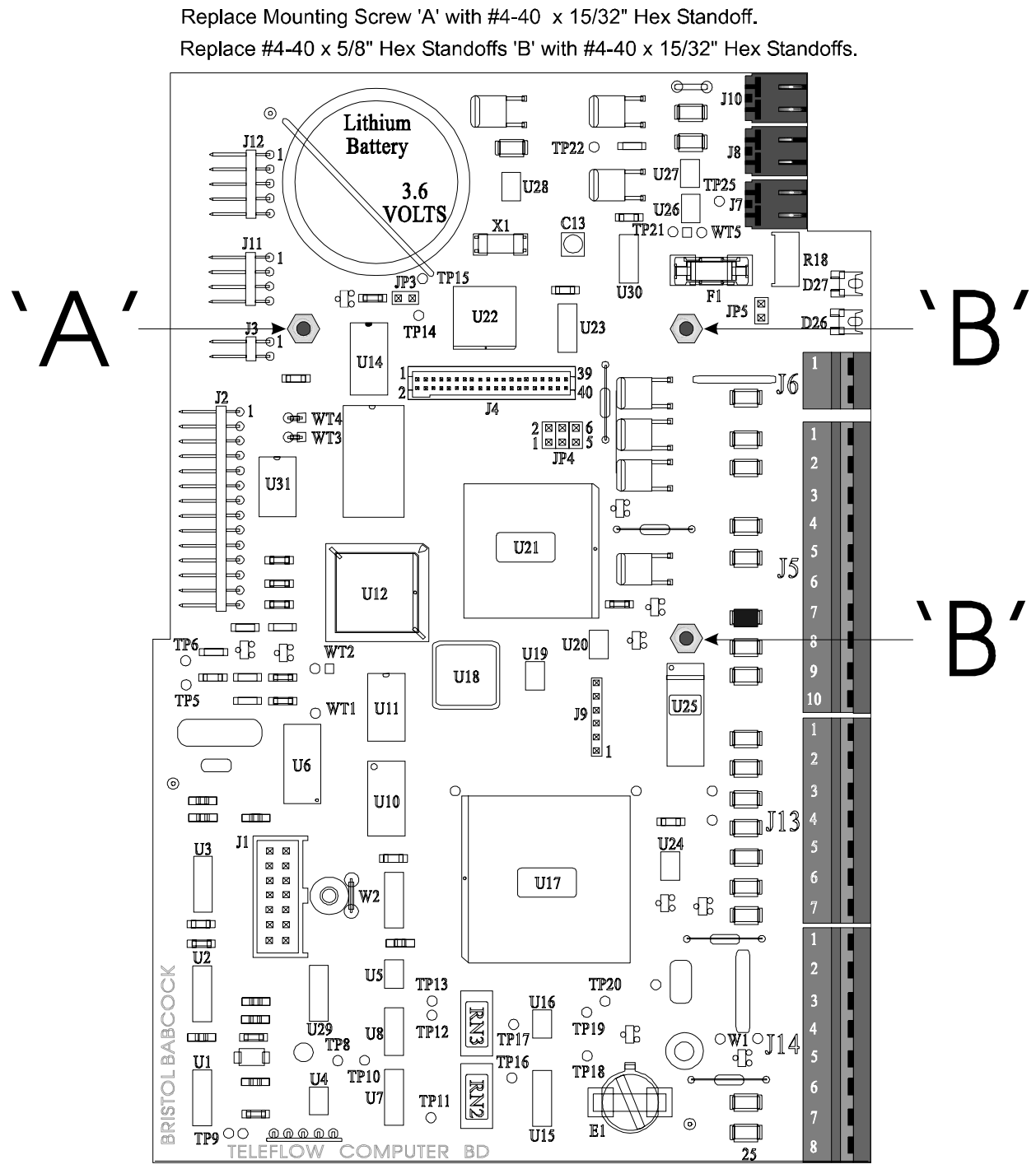

Figure 3 - TeleFlow CPU Board – Installation Drawing #1

9. Secure the EXP485/AO Board to the CPU Board by installing three (3) #4-40 x .188" Standoffs at locations 'A' and 'B' (see Figures 3 & 4).

10. Carefully install the Modified PC Shield, securing it to the Main Mounting Bracket (at locations 'C') with two #4-40 x 1/4" screws and to the CPU Board (at location 'B') with two (2) #4-40 x 1/8" SEM screws (see Figures 5, 6, 7 & 8).

11. Follow steps 2 through 6 in reverse order, replacing rather than removing the item in question.

12. Connect wiring between the EXP485/AO Board and the remote 3530-XXX units to which it is to be interfaced (see Section 2.2).

13. Configure the new network port in the ACCOL Load resident in the host 3530-XXX device.

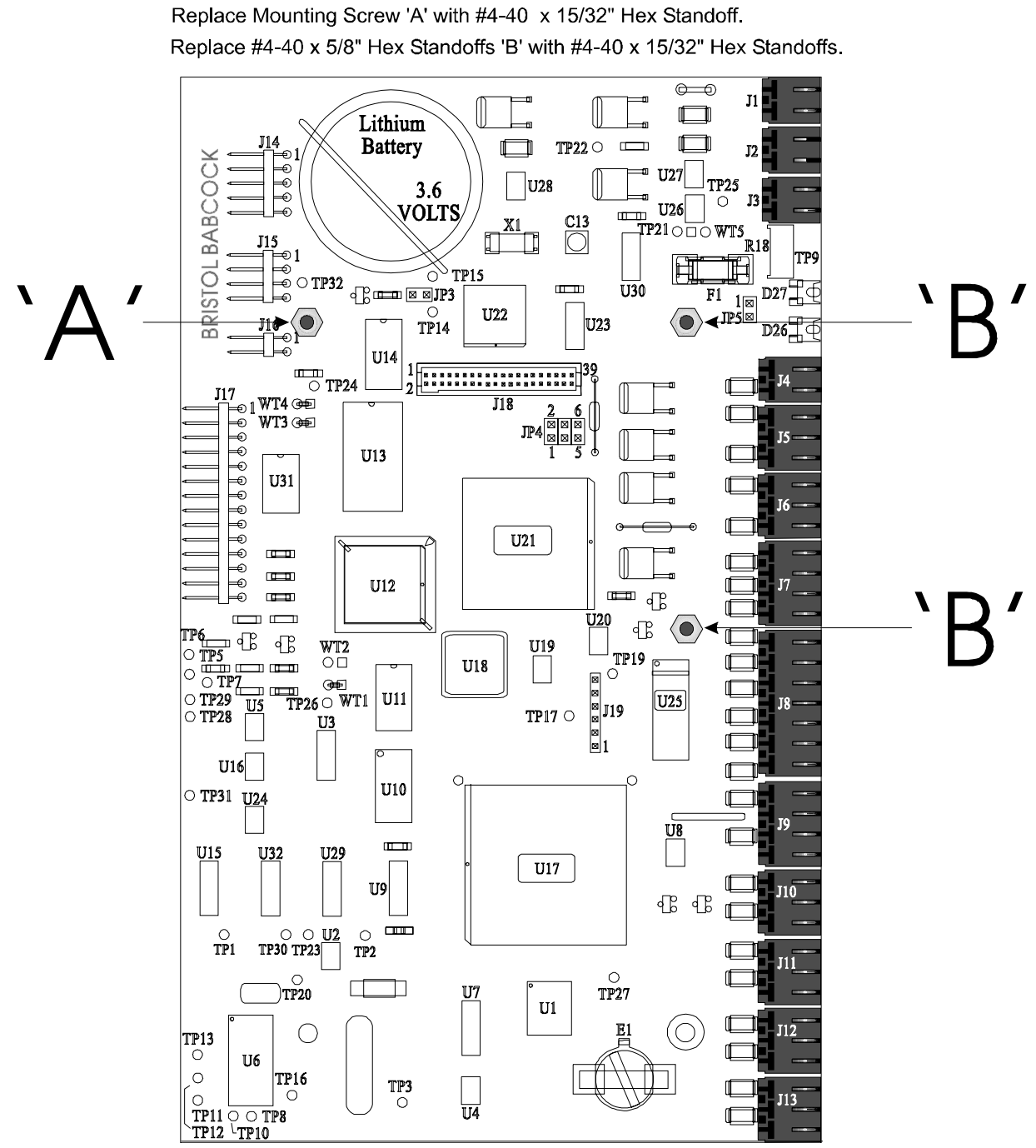
Replace Mounting Screw 'A' with #4-40 x 15/32" Hex Standoff.
Replace #4-40 x 5/8" Hex Standoffs 'B' with #4-40 x 15/32" Hex Standoffs.
'A'
'B'
'B'
Lithium Battery
3.6 VOLTS
BRISTOL BABCOCK

Figure 4 - TeleRTU CPU Board – Installation Drawing #1

14. Close and secure the Instrument Front Cover.

15. To remove an optional EXP485/AO Board, follow steps 1 through 6 (unplug the RS-485 cable during step 5). Remove the PC Shield along with the three Standoffs that secure

the EXP485/AO Board to the CPU Board. Then unplug the EXP485/AO Board from the CPU Board in question.

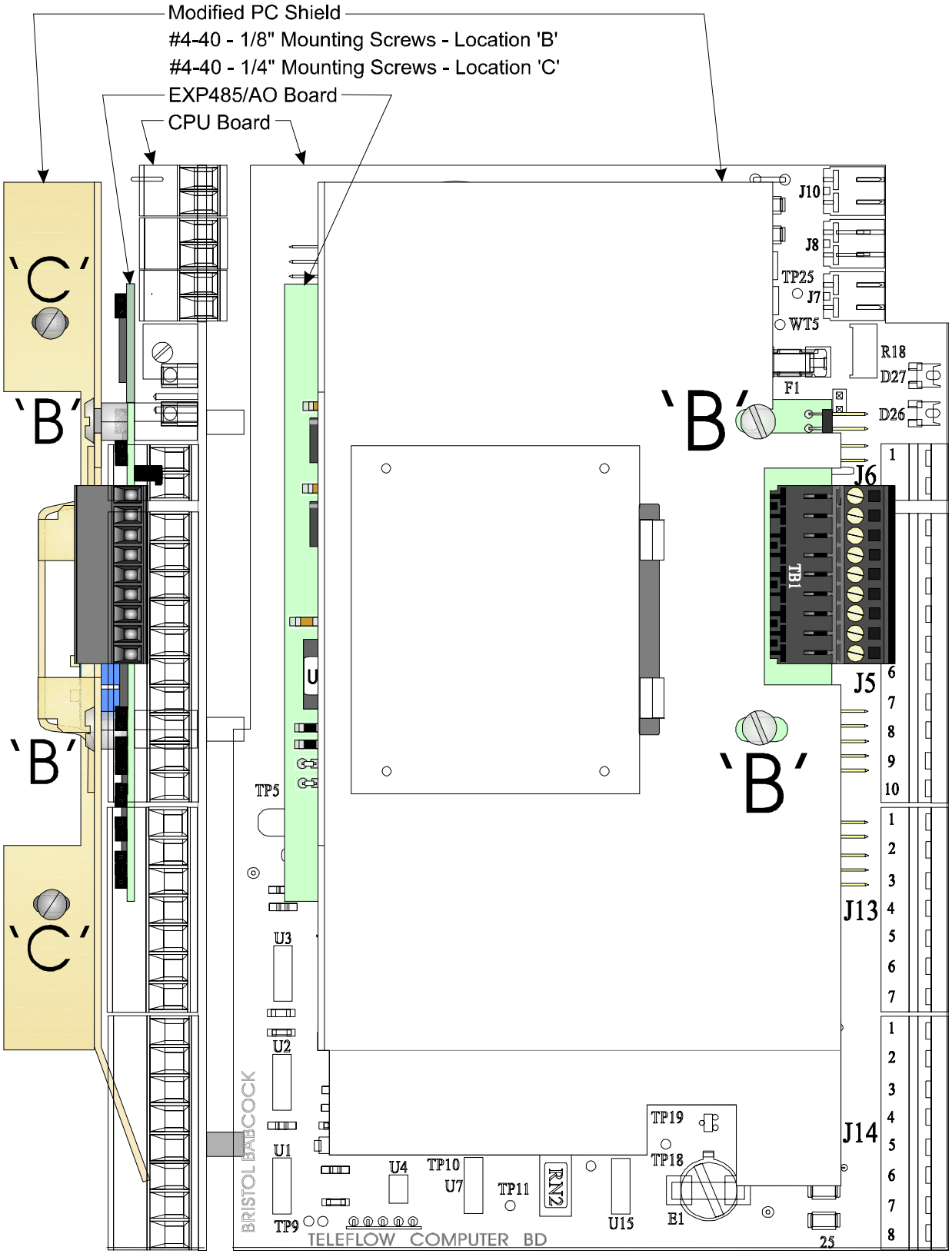

Figure 5 - TeleFlow CPU Board (with EXP485/AO Installed)
Installation Drawing #2

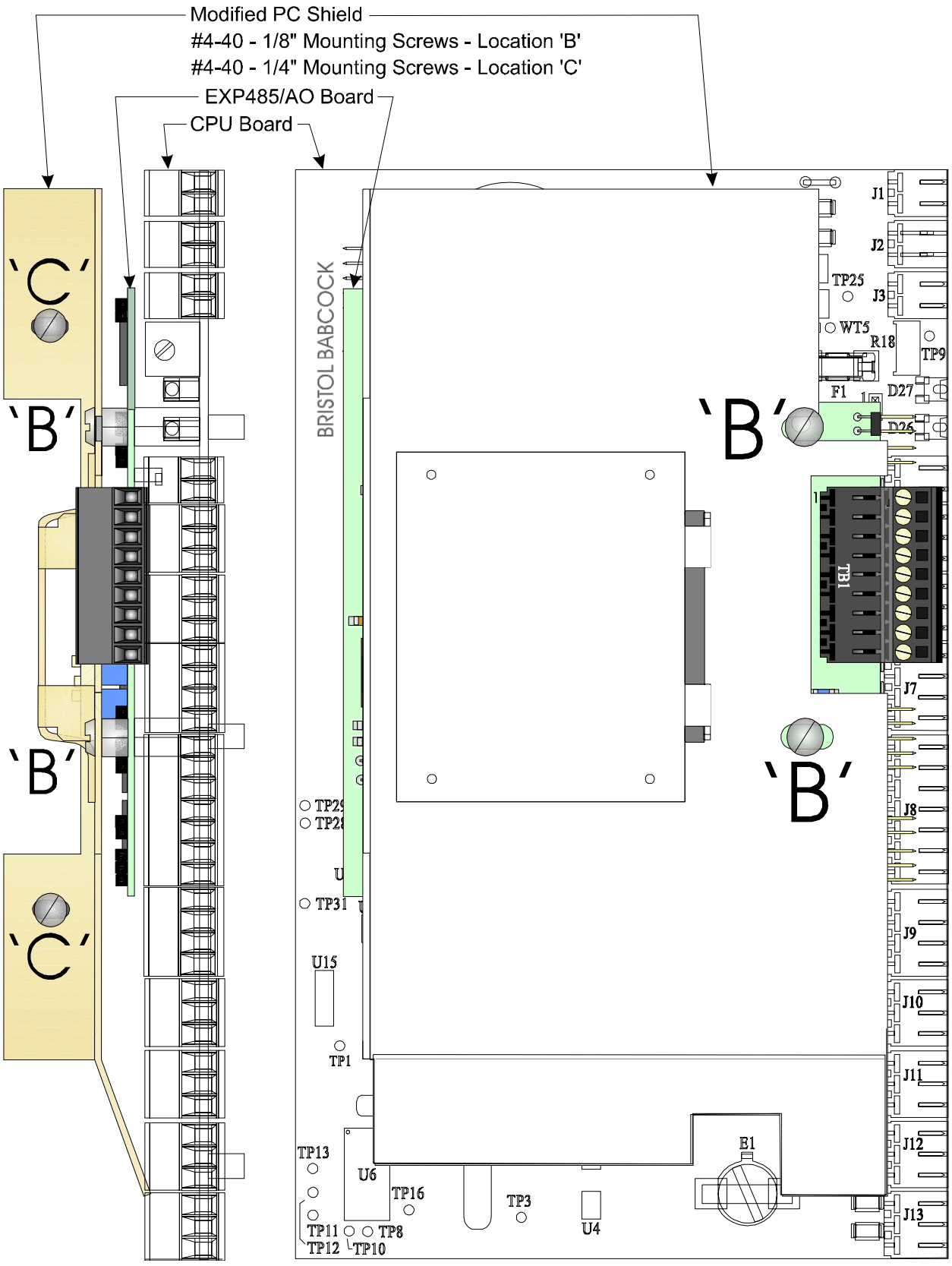

Figure 6 - TeleRTU CPU Board (with EXP485/AO Installed)
Installation Drawing #2

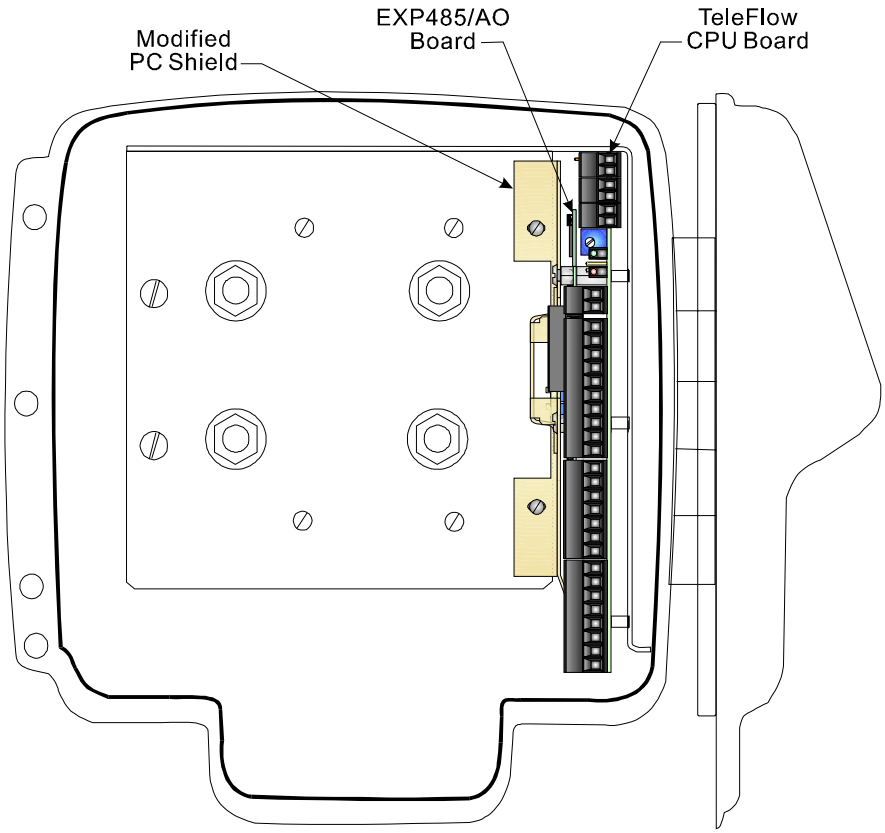

Figure 7 - 3530-10B, 3530-40B & 3530-50B (with EXP485/AO Installed)

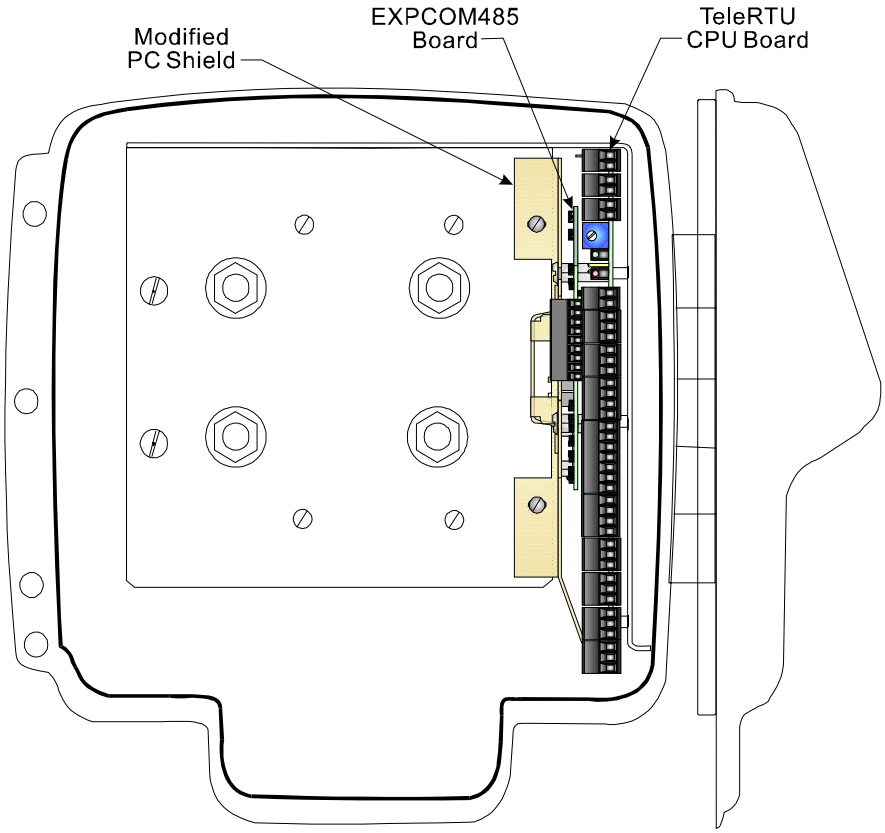

Figure 8 - 3530-15B (with EXP485/AO Installed)

2.1.1.2 Installation/Removal for Models 3530-20B & -25B

To install the optional EXP485/AO Board into a model 3530-20B or 3530-25B, follow steps 1 through 11 below. To remove the optional EXP485/AO Board, perform steps 1 and 2 and then follow steps 4 through 9 in reverse order, removing rather than installing the item in question after the system has been shut down. *Note: The Instrument Front Cover must be open.*

1. Open the Instrument Front Cover

2. Disconnect power by removing harness connector plug (P8 for TeleFlow - P2 for TeleRTU) from the CPU Board edge connector (J8 for TeleFlow - J2 for TeleRTU).

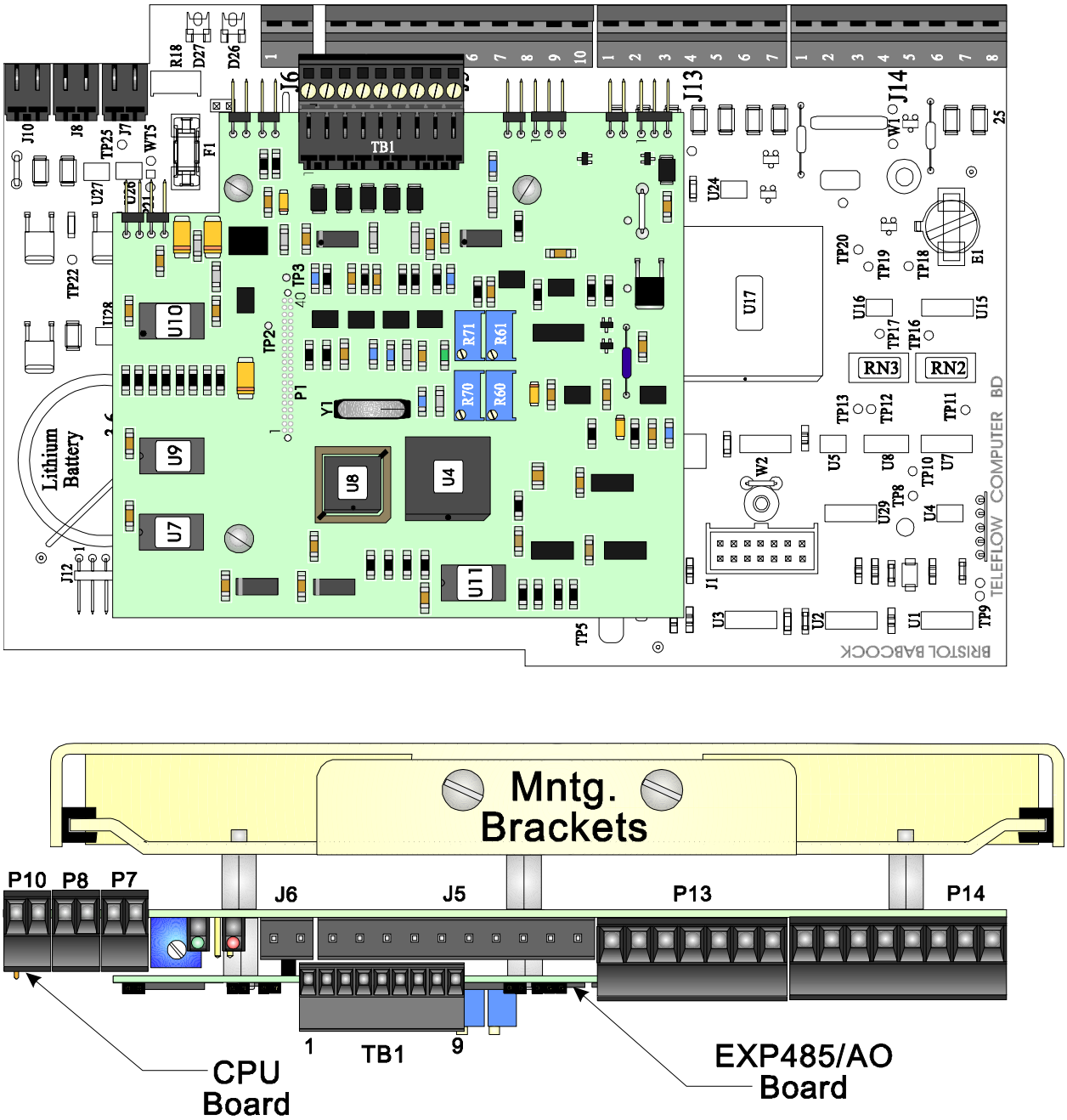

Figure 9 - 3530-20B CPU (with EXP485/AO Installed)

3. Unplug the remaining removable Terminal Blocks (with wiring harnesses installed) from the CPU Board's front edge connectors.

4. Remove the two screws that secure the CPU Board's Sliding Mounting Bracket to the Fixed Bracket on the bottom of the Battery Bracket. Carefully slide the CPU Board (and optional EXP485/AO Board) toward the front of the unit. Remove harness connections from the Front Panel Switch (J12 on the TeleFlow CPU - J14 on TeleRTU CPU), the Display Module (J2 on TeleFlow CPU - J16 on TeleRTU CPU), the Wakeup Switch (J3 on TeleFlow CPU - J16 on TeleRTU CPU), and for TeleFlow CPU Boards connector J1 (associated with the Multivariable Transducer).

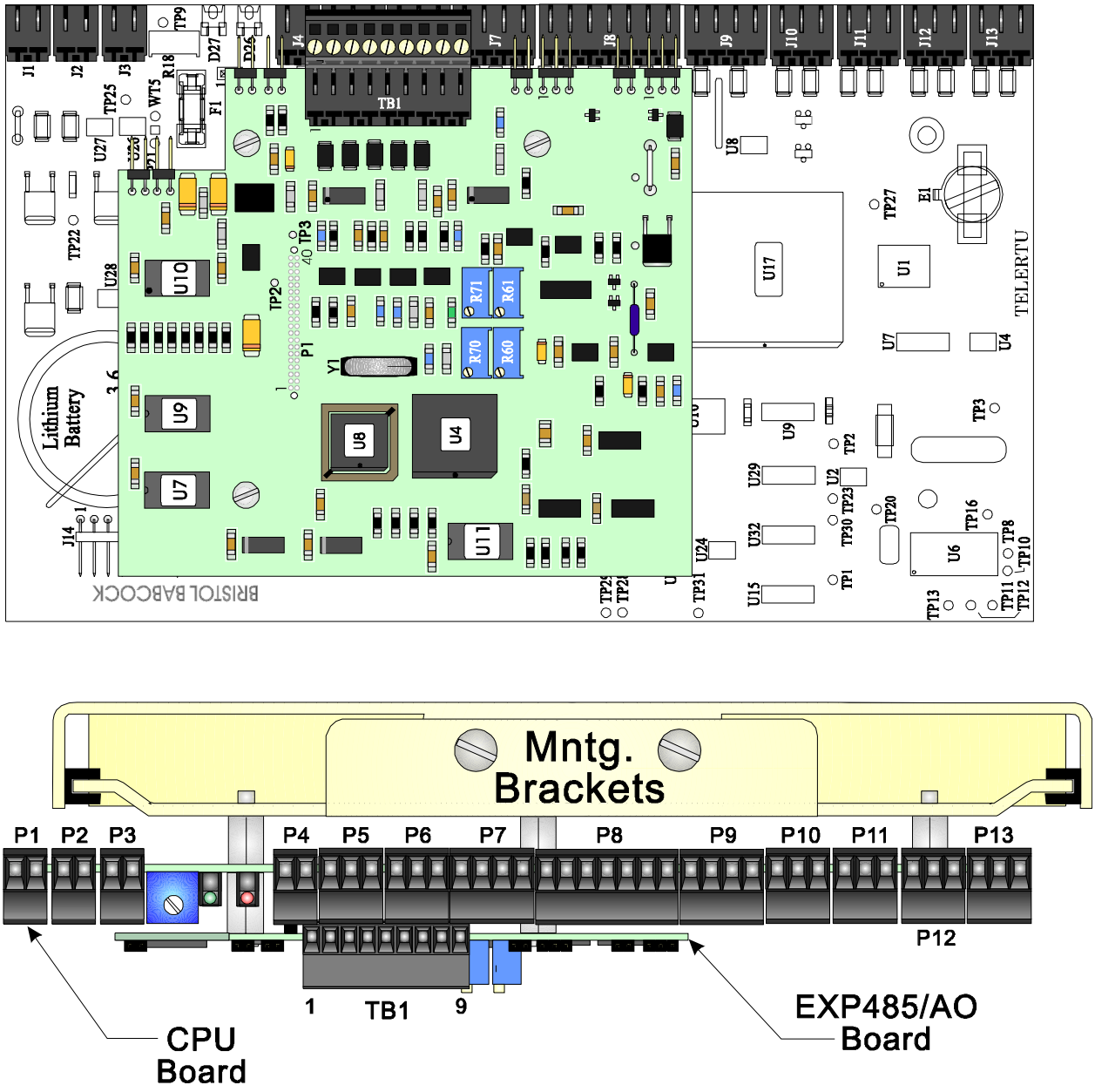

Figure 10 - 3530-25B CPU (with EXP485/AO Installed)

5. Remove the three screws (of five) that secure the CPU Board to the Sliding Mounting Bracket (locations 'A' & 'B' in Figures 3 & 4) and replace these items with the three new #4-40 x 15/32" Standoffs.

Note:
This operation should only be performed in an ESD safe area.

6. Align the EXP485/AO Board Connector P1 with CPU Board Connector J4 (for 3530-20B) or J18 (for 3530-25B). Push the EXP485/AO Board toward the CPU Board until Connector P1 is fully seated.

7. Secure the EXP485/AO Board to the CPU Board by installing three (3) #4-40 x 1/4" SEM screws as illustrated in Figures 9 & 10.

8. Route the RS-485 and AO cables through a ¾" conduit fitting (user installed) on the bottom of the enclosure.

9. Connect wiring between the EXP485/AO Board and the remote 3530-XXX units to which it is to be interfaced (see Section 2.2).

10. Configure the new network port in the ACCOL Load resident in the host 3530-XXX device.

11. Close and secure the Instrument Front Cover.

2.1.1.3 Installation/Removal for Models 3530-35B

To install the optional EXP485/AO Board into a model 3530-35B, follow steps 1 through 8 below. To remove the optional EXP485/AO Board, perform step 1 and then follow steps 5 through 7 in reverse order, removing rather than installing the item in question after the system has been shut down.

1. Disconnect power by removing harness connector plug P2 from the CPU Board edge connector J2.

2. Unplug the remaining removable Terminal Blocks (with wiring harnesses installed) from the CPU Board's front edge connectors.

3. Remove harness connections from the Front Panel Switch (J14), the Display Module (J16) and the Wakeup Switch (J16).

4. Remove the three screws (of five) that secure the CPU Board to the RTU Mounting Bracket (locations 'A' & 'B' in Figures 2 & 3) and replace these items with the three new #4-40 x 15/32" Standoffs.

Note:
This operation should only be performed in an ESD safe area.

5. Align the EXP485/AO Board Connector P1 with CPU Board Connector J18. Push the EXP485/AO Board toward the CPU Board until Connector P1 is fully seated.

6. Secure the EXP485/AO Board to the CPU Board by installing three (3) #4-40 x 1/4" SEM screws as illustrated in Figure 11.

7. Connect wiring between the EXP485/AO Board and the remote 3530-XXX units to which it is to be interfaced (see Section 2.2).

8. Configure the new network port in the ACCOL Load resident in the host 3530-XXX device.

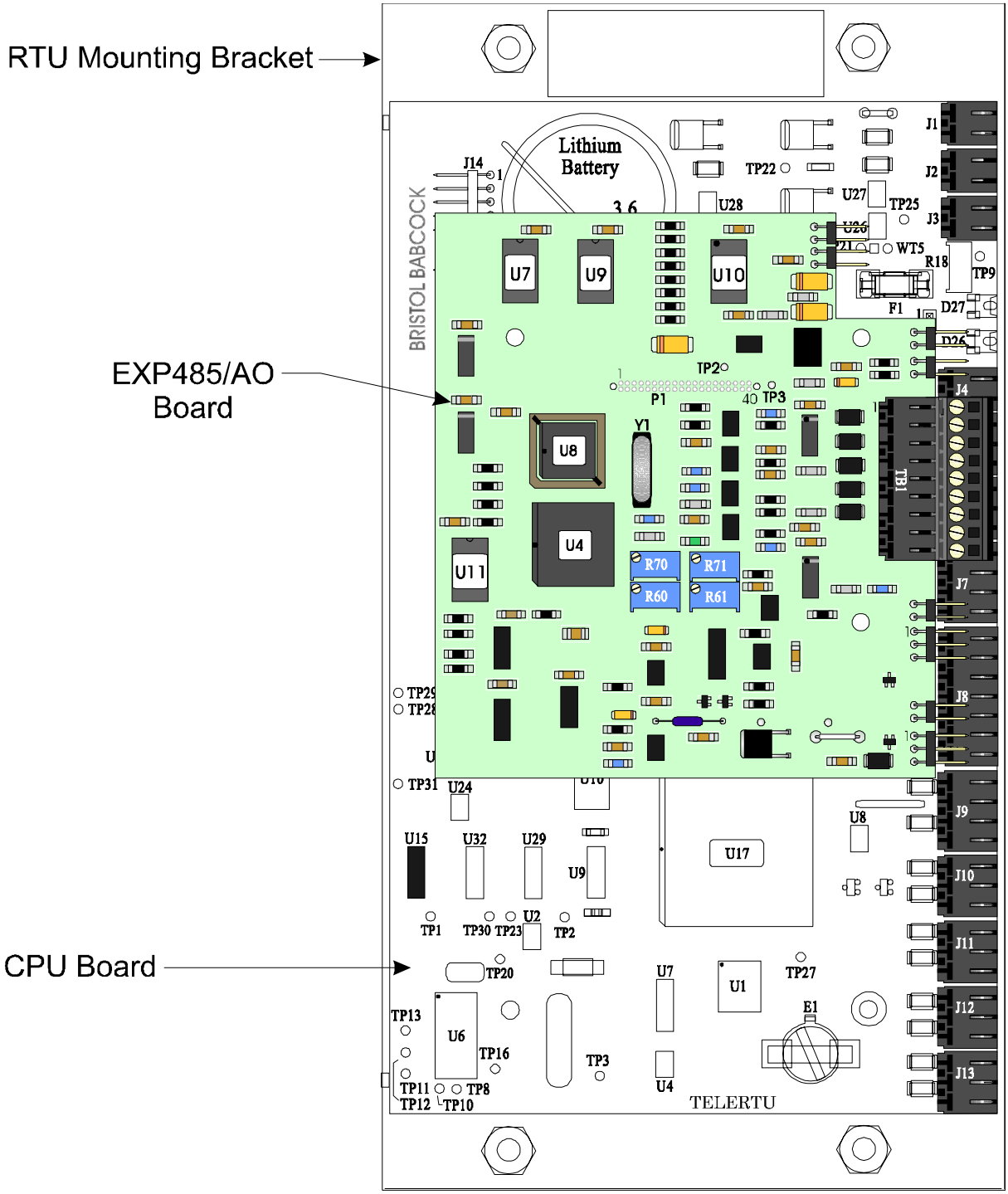

Figure 11 - 3530-35B (with EXP485/AO Installed)

2.2 RS-485 and AO WIRING

Figure 12 must be referenced to configure the RS-485 cable. It is recommended that a low capacitance 24-gauge communications grade 2-twisted pair cable such as Belden 9842 be used for RS-485 networking.

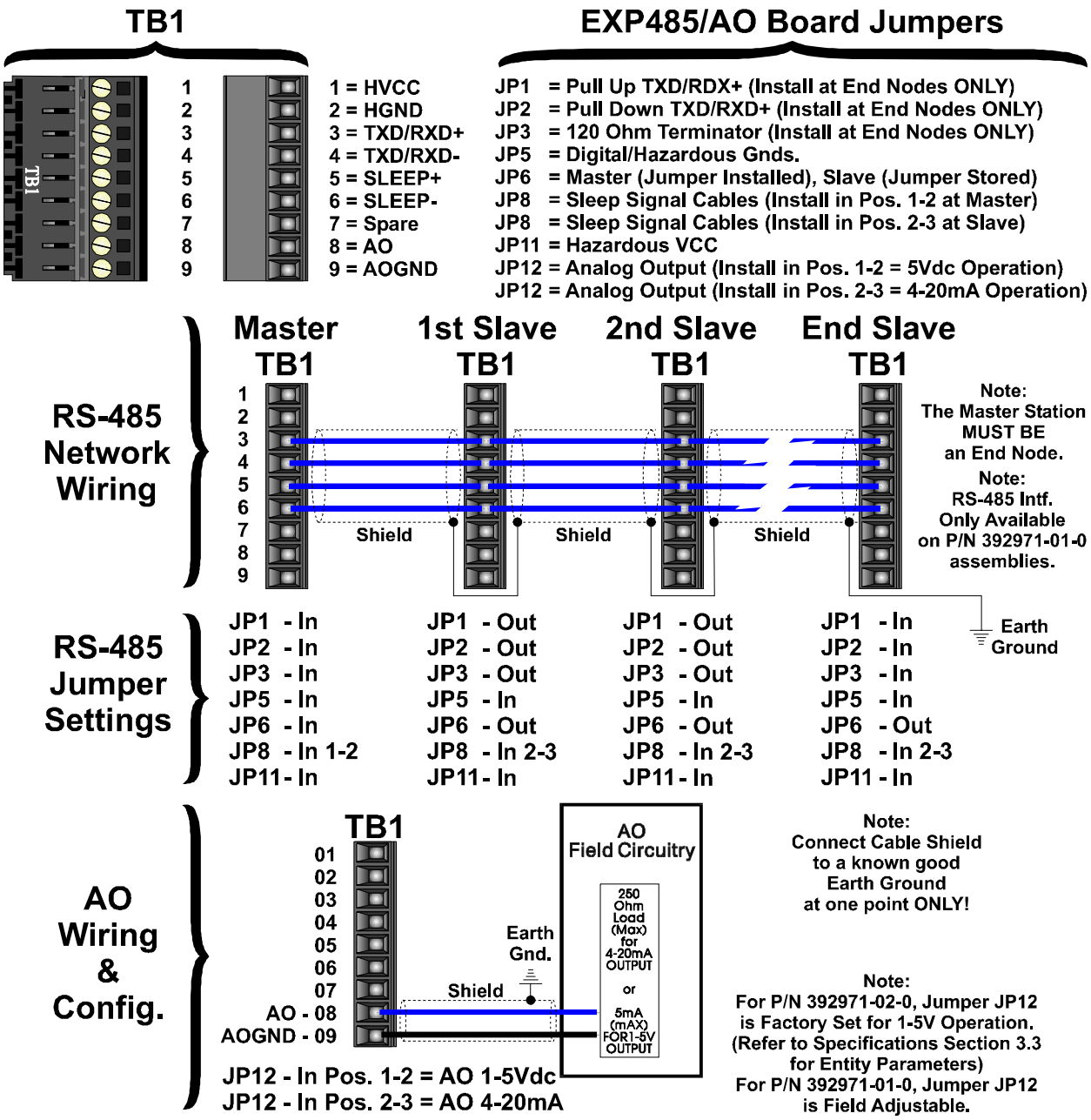
TB1
EXP485/AO Board Jumpers
TB1
1 = HVCC
2 = HGND
3 = TXD/RXD+
4 = TXD/RXD-
5 = SLEEP+
6 = SLEEP-
7 = Spare
8 = AO
9 = AOGND
JP1 = Pull Up TXD/RDX+ (Install at End Nodes ONLY)
JP2 = Pull Down TXD/RXD+ (Install at End Nodes ONLY)
JP3 = 120 Ohm Terminator (Install at End Nodes ONLY)
JP5 = Digital/Hazardous Gnds.
JP6 = Master (Jumper Installed), Slave (Jumper Stored)
JP8 = Sleep Signal Cables (Install in Pos. 1-2 at Master)
JP8 = Sleep Signal Cables (Install in Pos. 2-3 at Slave)
JP11 = Hazardous VCC
JP12 = Analog Output (Install in Pos. 1-2 = 5Vdc Operation)
JP12 = Analog Output (Install in Pos. 2-3 = 4-20mA Operation)
RS-485 Network Wiring
Master TB1
1st Slave TB1
2nd Slave TB1
End Slave TB1
Shield
Shield
Shield
Note: The Master Station MUST BE an End Node.
Note: RS-485 Intf. Only Available on P/N 392971-01-0 assemblies.
Earth Ground
RS-485 Jumper Settings
JP1 - In
JP2 - In
JP3 - In
JP5 - In
JP6 - In
JP8 - In 1-2
JP11 - In
JP1 - Out
JP2 - Out
JP3 - Out
JP5 - In
JP6 - Out
JP8 - In 2-3
JP11 - In
JP1 - Out
JP2 - Out
JP3 - Out
JP5 - In
JP6 - Out
JP8 - In 2-3
JP11 - In
JP1 - In
JP2 - In
JP3 - In
JP5 - In
JP6 - Out
JP8 - In 2-3
JP11 - In
AO Wiring & Config.
TB1
AO - 08
AOGND - 09
Earth Gnd.
Shield
AO Field Circuitry
250 Ohm Load (Max) for 4-20mA OUTPUT
or
5mA (mAX) FOR 1-5V OUTPUT
JP12 - In Pos. 1-2 = AO 1-5Vdc
JP12 - In Pos. 2-3 = AO 4-20mA
Note: Connect Cable Shield to a known good Earth Ground at one point ONLY!
Note: For P/N 392971-02-0, Jumper JP12 is Factory Set for 1-5V Operation. (Refer to Specifications Section 3.3 for Entity Parameters) For P/N 392971-01-0, Jumper JP12 is Field Adjustable.

Figure 12 - EXP485/AO Wiring Diagrams

The device uses compression-type terminals that accommodate up to #14 AWG wire. A connection is made by inserting the bared end (1/4 inch Max.) into the clamp beneath the screw and then securing the screw. Insert the bared end fully to prevent short circuits.

Allow some slack in the wires when making terminal connections. The slack makes the connections more manageable and minimizes mechanical strain on the printed circuit boards and harnesses.

Section 3
SPECIFICATIONS

3.1 PERFORMANCE SPECIFICATIONS

Baud Rate (Max.):	19.2K Asynchronous
Power Requirements:	+5Vdc @ 20mA Max. (Regulated) +5.8Vdc to +16Vdc @ 50mA Max. (Unregulated)
Transient Protection:	5V Bi-directional Transient Absorption Zeners across all RS-485 communication points 12V Bi-directional Transient Absorption Zeners across the AO points (when configured for 1-5Vdc operation) 16V Bi-directional Transient Absorption Zeners across the AO points (when configured for 4-20mA operation)
RS-485 Inputs/Outputs:	TXD/RDX+ (TB1-3) TXD/RXD- (TB1-4) SLEEP+ (TB1-5) SLEEP- (TB1-6)
Analog Output Pins:	AO (TB1-8) - 1-5Vdc @ 5mA Max. ONLY on 392971-02-0 (TB1-8) - 1-5Vdc @ 5mA Max. or 4-20mA on 392971-01-0 AOGND (TB1-9) - Analog Output Ground/Return
Interface Connector:	9-Pin Industrial 3.5mm Pitch Plugable Connector

3.2 ENVIRONMENTAL SPECIFICATIONS

Operating Temperature:	-40° to +60° (C) [-40° to 140° (F)]
Storage Temperature:	-40° to +85° (C) [-40° to 185° (F)]
Humidity:	15% to 90% RH (Non-Condensing)
Vibration:	10 to 500 Hz at 1g on any axis per SAMA PMC-31-1 without damage or impairment.
RFI Susceptibility:	Meets the requirement of IEC 1000-4-6 level 2 (3V/M) from 150kHz to 80MHz.
EMI Compatibility:	Designed to coexist inside a shielded enclosure with the TeleFlow electronics. EMI radiation is insignificant and Susceptibility is comparable or superior to associated Electronics.

Surge Susceptibility:	Designed to meet the requirements of ANSI/IEEE C37.90.1-1989 (Formerly IEEE 472) for surge withstand capability.
EMI Radiated:	Designed to meet the requirements of IEC 1004-4-3 for radiated emissions.

3.3 ENTITY PARAMETERS (INTRISICALLY SAFE EXPAO Bd.)

F1:	.125A
R66:	200 Ohms ±5%, .5W
D20/D21:	6.2V ±5%
Voc:	6.51V
Vmax:	15V
Isc:	34.3mA
Imax:	150mA
Ca:	400µF
Ci:	0µF
La:	80mH
Li:	0mH

Expansion RS-485 and/or Analog Output Board
Special Instructions for Class I, Division 2 Hazardous Locations

1. The BBI Expansion RS-485 and/or Analog Output (EXP485/AO) Board is listed by Underwriters Laboratories (UL) as nonincendive and is suitable for use in Class I, Division 2, Groups C and D hazardous locations or non-hazardous locations only. Read this document carefully before installing a nonincendive BBI Expansion RS-485 and/or Analog Output Board. In the event of a conflict between the Expansion RS-485 and/or Analog Output Board User Manual (PIP-EXP485/AO) and this document, always follow the instructions in this document.

2. Wiring must be performed in accordance with Class I, Division 2 wiring methods as defined in Article 501-4 (b) of the National Electrical Code, NFPA 70 for installations within the United States, or as specified in Section 18-152 of the Canadian Electrical Code for installation in Canada.

3. **WARNING: EXPLOSION HAZARD - Substitution of components may impair suitability for use in Class I, Division 2 environments.**

4. **WARNING: EXPLOSION HAZARD - When situated in a hazardous location, turn off power before servicing/replacing the unit and before installing or removing I/O wiring.**

5. **WARNING: EXPLOSION HAZARD - Do Not disconnect equipment unless the power has been switched off or the area is known to be nonhazardous.**

Expansion RS-485 and/or Analog Output Board for 3530-XXX
Special Instructions for Class I, Division 1 Hazardous Locations

1. A version of the Expansion RS-485 and/or Analog Output (EXP485/AO) Board is available that is listed by Underwriters Laboratories (UL) as intrinsically safe for use in Class I, Division 1, Groups C and D hazardous locations. Read this document carefully before installing an intrinsically safe Expansion RS-485 and/or Analog Output Board. Refer to the Expansion RS-485 and/or Analog Output Board User's Manual (PIP-EXP485/AO) for general information. In the event of a conflict between the Expansion RS-485 and or Analog Output User's Manual and this document, always follow the instructions in this document.

2. Only the depopulated version of the Expansion RS-485 and/or Analog Output Board (EXP485/AO) (P/N 392971-02-0) may be used in a Class I, Division 1 hazardous location.

3. TeleFlow models 3530-10B, 3530-40B and 3530-50B approved for use in Class I, Division 1, Groups C and D hazardous locations and equipped with the EXP485/AO Board option may reside in a Division 1, 2 or nonhazardous area. 3530-XXX units not approved for use in a Class I, Division 1 environment may contain an EXP485/AO Board but can only reside in a Class I, Division 2 or nonhazardous area.

CAUTION

When connecting the Expansion Analog Output Board to a TeleFlow that is mounted in a Division 1 area, wire all circuits using wiring methods specified in article 501-4(A) of the National Electrical Code NFPA 70.

When installing an Expansion RS-485 and/or Analog Output Board (EXP485/AO) into a TeleFlow that is mounted in a Division 2 area, ensure that the area is nonhazardous before connecting or disconnecting the nonhazardous interface.

4. Intrinsically safe TeleFlows equipped with an intrinsically safe EXPAO Board (P/N 392971-02-0) do not include any internal communications options.

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Please help us make our documentation more useful to you! If you have a complaint, a suggestion, or a correction regarding this manual, please tell us by mailing this page with your comments. It's the only way we know we're doing our job by giving you correct, complete, and useful documentation.

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ISSUE DATE: JAN., 2003
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